

CLAIMS

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1. (Canceled)

2. (Canceled)

3. (Canceled)

4. (Canceled)

1 5. (After Amendment) A PDP production method comprising:

2 a bonding step for putting a front panel (10) and a
3 back panel (20) together to form inner space between the panels,
4 and bonding the front panel and the back panel by maintaining a
5 bonding temperature equal to or higher than a temperature at
6 which the sealing material softens, a fluorescent substance
7 layer (25) being formed on at least one of the front panel and
8 the back panel, and a sealing material layer (15) being formed
9 on at least one of the front panel and the back panel, wherein
10 the bonding step is performed while steam vapor is
11 forced to exhaust from the inner space.

1 6. The PDP production method of Claim ¹¹² 5, wherein

2 the bonding step is ^{further} performed while ^a ~~the~~ dry gas is
3 circulated in the inner space.

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1 7. The PDP production method of Claim 6, wherein
2 the bonding step is performed while an operation of
3 charging the dry gas into the inner space and an operation of
4 exhausting gases from the inner space are performed
5 alternately.

1 8. (After Amendment) A PDP production method comprising:
2 a bonding step for putting a front panel (10) and a
3 back panel (20) together to form inner space between the panels,
4 and bonding the front panel and the back panel, a fluorescent
5 substance layer (25) being formed on at least one of the front
6 panel and the back panel; and

7 a heating step for heating the bonded front panel and
8 the back panel to a temperature higher than a room temperature
9 while a dry gas is circulated in the inner space.

1 9. (After Amendment) The PDP production method of Claim 8
2 further comprising:

3 an exhausting step for, after the heating step,
4 exhausting gases from the inner space while maintaining an
5 exhaust temperature for the bonded panels higher than a room
6 temperature.

1 10. (After Amendment) A PDP production method comprising:

2 a heating step for heating a first panel (10) while

3 an MgO layer formed on the first panel (10) is in contact with
4 a dry gas; and
5 a bonding step for, after the heating step, putting
6 the first panel and a second panel (20) together, and bonding
7 the first panel and the second panel, a fluorescent substance
8 layer (25) being formed on the second panel.

11. (Canceled)

1 12. (After Amendment) The PDP production method of Claim 5,
2 wherein
3 in the bonding step, temporary baking of the sealing
4 material layer is further performed.

1 13. The PDP production method of Claim 6, wherein
2 the bonding step is performed while the dry gas is
3 circulated in the inner space and a pressure inside the inner
4 space is maintained a bonding pressure lower than atmospheric
5 pressure.

14. (Canceled)

15. (Canceled)

1 16. The PDP production method of Claim 13, wherein

the front panel and the back panel are heated while the fluorescent substance layer is under a pressure higher than the bonding pressure, then a gas pressure in the inner space is reduced to the bonding pressure, and the bonding step is started in this condition.

17. The PDP production method of Claim 16, wherein

the front panel and the back panel are heated to a temperature equal to or higher than a softening point of the sealing material while the fluorescent substance layer is under a pressure higher than the bonding pressure, then a gas pressure in the inner space is reduced to the bonding pressure, and the bonding step is started in this condition.

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. The PDP production method of Claim 6, wherein

in the sealing material layer forming step, the sealing material layer is formed in a frame shape at an outer

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4 region of at least one of: the side of the front panel facing
5 the back panel; and the side of the back panel facing the front
6 panel, and

7 a plurality of partition walls are formed in stripes,
8 before the bonding step, on one of: the side of the front panel
9 facing the back panel; and the side of the back panel facing the
10 front panel so that the plurality of partition walls are inside
11 the sealing material layer and that a pair of first gaps are
12 formed between edges of the plurality of partition walls and two
13 inside sides of the sealing material layer, wherein the minimum
14 width of the pair of first gaps is larger than the minimum width
15 of a pair of second gaps between two outermost ones of the
16 plurality of partition walls and the other sides of the sealing
17 material layer, and

18 in the bonding step, the dry gas moves from one of the
19 pair of first gaps to the other.

1 23. The PDP production method of Claim 6, wherein

2 in the sealing material layer forming step, the
3 sealing material layer is formed in a frame shape at an outer
4 region of at least one of: the side of the front panel facing
5 the back panel; and the side of the back panel facing the front
6 panel, and

7 a plurality of first partition walls are formed in
8 stripes, before the bonding step, on one of: the side of the

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9 front panel facing the back panel; and the side of the back
10 panel facing the front panel so that the plurality of partition
11 walls are inside a second partition wall which is formed to be
12 in contact with inside of the sealing material layer and that a
13 pair of first gaps are formed between edges of the plurality of
14 partition walls and two inside sides of the second partition
15 wall, wherein the minimum width of the pair of first gaps is
16 larger than the minimum width of a pair of second gaps between
17 two outermost ones of the plurality of partition walls and the
18 other sides of the second partition wall, and

19 in the bonding step, the dry gas moves from one of the
20 pair of first gaps to the other.

1 24. (After Amendment) A PDP production method comprising:
2 a preparative heating step for heating a front panel
3 (10) and a back panel (20) in an atmosphere of dry gas while a
4 space is opened between the sides of the panels facing each
5 other, a fluorescent substance layer (25) being formed on at
6 least one of the front panel and the back panel, and a sealing
7 material layer (15) being formed on at least one of the front
8 panel and the back panel; and
9 a bonding step for, immediately after the preparative
10 heating step, putting the front panel and the back panel
11 together to form inner space between the panels, and bonding the
12 front panel and the back panel by maintaining a bonding

13 temperature equal to or higher than a softening point of the
14 sealing material.

1 25. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature lower than the
4 softening point of the sealing material, and
5 in the bonding step, the panels are put together and
6 heated to the bonding temperature to be bonded together.

1 26. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature higher than the
4 bonding temperature, and
5 the front panel and the back panel are cooled to the
6 bonding temperature then the bonding step is started.

1 27. The PDP production method of Claim ~~24~~, wherein
2 the preparative heating step is performed while the
3 front panel and the back panel are under a pressure lower than
4 an atmospheric pressure.

28. (Canceled)

1 29. (After Amendment) The PDP production method of Claim ~~24~~,

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2 wherein

3 the preparative heating step is performed while the
4 front panel and the back panel are in an atmosphere in which a
5 dry gas is circulated.

1 30. The PDP production method of Claim ~~24~~, wherein

2 the preparative heating step is performed while gases
3 released from the front panel and the back panel when the panels
4 are heated are forcibly exhausted to outside.

1 31. The PDP production method of Claim ~~24~~ further comprising:

2 a separating step for properly positioning the front
3 panel and the back panel, putting the panels together, and
4 separating the front panel and the back panel from each other by
5 moving the panels along a certain path, the separating step
6 being performed before the preparative heating step, wherein
7 in the bonding step, the front panel and the back
8 panel are put together by moving the panels in a direction
9 opposite to a movement along the certain path of the separating
10 step.

1 32. The PDP production method of Claim 31, wherein

2 in the separating step and the bonding step, the front
3 panel and the back panel are moved to positions parallel to
4 themselves.

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1 33. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to 200°C or higher.

1 34. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to 300°C or higher.

1 35. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature in a range of 300°C
4 to 400°C.

1 36. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to 400°C or higher.

1 37. The PDP production method of Claim ~~24~~, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature in a range of 450°C
4 to 520°C.

1 38. The PDP production method of Claim ~~24~~, wherein
2 in the sealing material layer forming step, the

3 sealing material layer is formed on both of the side of the
4 front panel facing the back panel; and the side of the back
5 panel facing the front panel, and

6 in the bonding step, the front panel and the back
7 panel are put together by matching the sealing material layers
8 formed on the panels to each other.

1 39. A PDP production method comprising:

2 a sealing material layer forming step for forming a
3 sealing material layer on both of: a side of a front panel
4 facing a back panel; and a side of the back panel facing the
5 front panel; and

6 a bonding step for bonding the front panel and the
7 back panel by matching the sealing material layers formed on the
8 panels to each other.

1 40. A PDP production method comprising:

2 a fluorescent substance layer forming step for forming
3 a fluorescent substance layer on at least one of: a side of a
4 front panel facing a back panel; and a side of the back panel
5 facing the front panel;

6 a sealing material application step for applying a
7 sealing material to at least one of: the side of the front panel
8 facing the back panel; and the side of the back panel facing the
9 front panel;

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10 a bonding step for, after the fluorescent substance
11 layer forming step and the sealing material application step,
12 putting the front panel and the back panel together to form
13 inner space between the panels, and bonding the front panel and
14 the back panel by maintaining a bonding temperature equal to or
15 higher than a softening point of the sealing material; and
16 an exhausting step for exhausting gases from the inner
17 space while an exhaust temperature for the bonded panels higher
18 than a room temperature is maintained, wherein
19 the exhausting step is started without cooling the
20 front panel and the back panel bonded in the bonding step to the
21 room temperature.

1 41. A PDP production method comprising:

2 a fluorescent substance layer forming step for forming
3 a fluorescent substance layer on at least one of: a side of a
4 front panel facing a back panel; and a side of the back panel
5 facing the front panel;

6 a sealing material application step for applying a
7 sealing material to at least one of: the side of the front panel
8 facing the back panel; and the side of the back panel facing the
9 front panel;

10 a sealing material temporary baking step for
11 temporarily baking either or both of the front panel and the
12 back panel to which the sealing material has been applied by

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13 maintaining a temporary baking temperature, and
14 a bonding step for, after the fluorescent substance
15 layer forming step and the sealing material temporary baking
16 step, putting the front panel and the back panel together to
17 form inner space between the panels, and bonding the front panel
18 and the back panel by maintaining a bonding temperature equal to
19 or higher than a softening point of the sealing material,
20 wherein
21 the bonding step is started without cooling to a room
22 temperature the one or two panels whose temporary baking
23 temperature has been maintained during the sealing material
24 temporary baking step.

1 42. A PDP production method comprising:

2 a fluorescent substance layer forming step for forming
3 a fluorescent substance layer on at least one of: a side of a
4 front panel facing a back panel; and a side of the back panel
5 facing the front panel;

6 a sealing material application step for applying a
7 sealing material to at least one of: the side of the front panel
8 facing the back panel; and the side of the back panel facing the
9 front panel;

10 a sealing material temporary baking step for
11 temporarily baking either or both of the front panel and the
12 back panel to which the sealing material has been applied by

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13 maintaining a temporary baking temperature,
14 a bonding step for, after the fluorescent substance
15 layer forming step and the sealing material temporary baking
16 step, putting the front panel and the back panel together to
17 form inner space between the panels, and bonding the front panel
18 and the back panel by maintaining a bonding temperature equal to
19 or higher than a softening point of the sealing material; and
20 an exhausting step for exhausting gases from the inner
21 space while an exhaust temperature for the bonded panels higher
22 than a room temperature is maintained, wherein
23 the front panel and the back panel are maintained in
24 a temperature higher than a room temperature through all steps
25 from the sealing material temporary baking step to the
26 exhausting step.

1 43. The PDP production method of Claim 41 ~~or Claim 42,~~
2 wherein
3 the bonding step is started after the one or two
4 panels whose temporary baking temperature has been maintained
5 during the sealing material temporary baking step are heated to
6 the bonding temperature.

1 44. The PDP production method of Claim 40 ~~or Claim 42,~~
2 wherein
3 the exhausting step is started after the bonded front

4 panel and the back panel are cooled to the exhaust
5 temperature.

1 45. The PDP production method of Claim 40 or ~~Claim 42~~,
2 wherein

3 the exhausting step is started after the bonded front
4 panel and the back panel are maintained in the bonding
5 temperature.

1 46. The PDP production method of Claim 41 or ~~Claim 42~~,
2 wherein

3 the sealing material temporary baking step is
4 performed while a space is opened between the sides of the
5 panels facing each other, and

6 the PDP production method further comprises between
7 the sealing material temporary baking step and the bonding
8 step:

9 a preparative heating step for heating the front panel
10 and the back panel while a space is opened between the sides of
11 the panels facing each other.

1 47. The PDP production method of Claim 46, wherein

2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature higher than the
4 temporary baking temperature.

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1 48. The PDP production method of Claim 46, wherein
2 in the preparative heating step, the front panel and
3 the back panel are heated to a temperature higher than the
4 temporary baking temperature, and then
5 the bonding step is started after the front panel and
6 the back panel are cooled to the bonding temperature.

1 49. The PDP production method of Claim 46, wherein
2 the preparative heating step is performed under a
3 pressure lower than an atmospheric pressure.

1 50. The PDP production method of Claim 46, wherein
2 the preparative heating step is performed in an
3 atmosphere of dry gas.

1 51. The PDP production method of ~~one of Claims 40 to 42,~~
2 wherein
3 the bonding step is performed while a dry gas is
4 circulated in the inner space.

1 52. The PDP production method of Claim 41 ~~or Claim 42,~~
2 wherein
3 in the sealing material temporary baking step, the
4 front panel and the back panel are put together to form inner

5 space between the panels, and the sealing material temporary
6 baking step is performed while a dry gas is circulated in the
7 inner space.

53. (Canceled)

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55. (Canceled)

56. (Canceled)

1 57. (After Amendment) The PDP production method of Claim 9,
2 wherein
3 the temperature in the heating step is equal to or
4 higher than the exhaust temperature.

1 58. (After Amendment) The PDP production method of Claim 9,
2 wherein
3 at least one of the temperature in the heating step
4 and the exhaust temperature is 360°C or higher.

1 59. (After Amendment) The PDP production method of Claim 9,
2 wherein
3 at least one of the temperature in the heating step

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4 and the exhaust temperature is 380°C or higher.

1 60. (After Amendment) The PDP production method of Claim 9,
2 wherein

3 at least one of the temperature in the heating step
4 and the exhaust temperature is 400°C or higher.

61. (Canceled)

62. (Canceled)

1 63. (After Amendment) The PDP production method of ~~one of~~
2 ~~Claims 6 to 10, 12, 13, 16, 17, and 22 to 24~~, wherein
3 the dry gas contains oxygen.

1 64. (After Amendment) The PDP production method of ~~one of~~
2 ~~Claims 6 to 10, 12, 13, 16, 17, and 22 to 24~~, wherein
3 the dry gas is dry air.

1 65. (After Amendment) A PDP produced in accordance with the PDP
2 production method of one of Claims 5 to 10, 12, 13, 16, 17, 22
3 to 27, 29 to 38, and 57 to 60.

66. (Canceled)

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67. (Canceled)

68. (Canceled)

69. (Canceled)

1 70. A PDP including a plurality of cells formed between a pair
2 of panels parallel to each other, the plurality of cells
3 including blue cells in each of which a blue fluorescent
4 substance layer is formed, and the plurality of cells being
5 filled with a gas medium, wherein
6 the chromaticity coordinate y in the CIE color
7 specification of light emitted from the blue cells when vacuum
8 ultraviolet rays are radiated onto the blue cells to excite the
9 blue cells is 0.07 or less.

71. (Canceled)

72. (Canceled)

1 73. (After Amendment) A PDP including a plurality of cells
2 formed between a pair of panels parallel to each other, the
3 plurality of cells including blue cells in each of which a blue
4 fluorescent substance layer is formed, and the plurality of
5 cells being filled with a gas medium, wherein

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6 a peak wavelength of a spectrum of light emitted when
7 a blue fluorescent substance is excited by a vacuum ultraviolet
8 ray is 453nm or less.

74. (Canceled)

75. (Canceled)

76. (Canceled)

77. (Canceled)

1 78. A PDP including a plurality of cells formed between a pair
2 of panels parallel to each other, the plurality of cells
3 including blue cells in each of which a blue fluorescent
4 substance layer is formed, the plurality of cells including
5 green cells in each of which a green fluorescent substance layer
6 is formed, and the plurality of cells being filled with a gas
7 medium, wherein

8 a ratio of a peak intensity of spectrum of light
9 emitted from the blue cells after the blue fluorescent substance
10 layers in the blue cells are excited by vacuum ultraviolet rays
11 to a peak intensity of spectrum of light emitted from the green
12 cells after the green fluorescent substance layers in the green
13 cells are excited by the vacuum ultraviolet rays is 0.8 or

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14 more.

79. (Canceled)

1 80. (After Amendment) The PDP of one of Claims 70, 73, and 78,
2 wherein
3 the blue fluorescent substance layer is made of
4 $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}$.

81. (Canceled)

1 82. A PDP including a plurality of cells formed between a pair
2 of panels parallel to each other, the plurality of cells
3 including blue cells in each of which a blue fluorescent
4 substance layer is formed, and the plurality of cells being
5 filled with a gas medium, wherein
6 the blue fluorescent substance layer is made of
7 $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}$, and
8 a ratio of c-axis length to a-axis length in crystal
9 of the blue fluorescent substance layer is 4.0218 or less.

1 83. A PDP including a plurality of cells formed between a pair
2 of panels parallel to each other, the plurality of cells
3 including blue cells in each of which a blue fluorescent
4 substance layer is formed, and the plurality of cells being

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5 filled with a gas medium, wherein

6 the blue fluorescent substance layer is made of

7 BaMgAl₁₀O₁₇:Eu, and

8 a peak value in the number of molecules contained in

9 H₂O desorbed from the blue fluorescent substance layer at 200°C

10 or higher is 1×10^{16} /g or less when measured based on a TDS

11 analysis method.

84. (Canceled)

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97. (Canceled)

98. (Canceled)

1 99. A PDP production apparatus for putting a front panel and a
2 back panel together with a fluorescent substance layer formed on
3 at least one of: a side of the front panel facing the back
4 panel; and a side of the back panel facing the front panel and
5 with a sealing material formed between the front panel and the
6 back panel, and bonding the panels to form inner space between
7 the panels by heating the panels and softening the sealing
8 material, the PDP production apparatus comprising:

9 a heating mechanism for heating the front panel and
10 the back panel;

11 a moving mechanism for moving the front panel and the
12 back panel having been put together to separate the panels from
13 each other along a certain path and putting the front panel and

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14 the back panel by moving the panels in an opposite direction.

100. (Canceled)

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103. (Canceled)

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105. (Canceled)

106. (Canceled)

107. (Canceled)

108. (Canceled)

1 109. (After Amendment) A PDP display apparatus comprising:

2 a PDP produced by the PDP production method of one of
3 Claims 5 to 10, 12, 13, 16, 17, 22 to 27, 29 to 52, and 57 to
4 60; and

5 an activating circuit for activating the PDP.

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- 1 110. (After Amendment) A PDP display apparatus comprising:
2 the PDP of one of Claims 70, 73, and 78; and
3 an activating circuit for activating the PDP.

- 1 111. A PDP display apparatus comprising:
2 the PDP of Claim 80; and
a activating circuit for activating the PDP.
- add*
to 110